Articles

Adapting Residency Training
Training Adaptable Residents

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Graduate medical education has been criticized for failing to adequately prepare young physicians to enter the workforce upon completion of their training. In addressing this criticism, the author makes arguments both for and against this assertion. Broad qualitative changes (graduate medical education training position allocation, subspecialists' role in health care delivery, educational quality, faculty development, and faculty promotion) that graduate medical education has undergone and is undergoing are discussed. Population health management, clinical resource management, teamwork, continuous quality improvement, ethics, and evidence-based medicine are addressed as important curricular elements for residency training. Innovations in graduate medical education that are being introduced as well as those that should be tried are discussed. Finally, the author asserts that although residency education should not be vocationally driven by the needs of managed care organizations, a powerful opportunity exists for collaborative educational research between academic medicine and managed care organizations. In a health care environment undergoing rapid changes, the primary goals of graduate medical education have not significantly changed: to produce compassionate physicians with a passion for lifelong learning who have leadership skills, are critical thinkers, skilled at self-assessment, and able to adapt to the needs of the health care marketplace.

(Bowen JL. Adapting residency training—training adaptable residents. West J Med 1998; 168:371–377)

Leaders in health care have asserted that present-day graduate medical education (GME) fails to adequately prepare physicians to enter the workforce because they neither fully understand the health care environment nor know how to function effectively within it. Further, they challenge leaders in medical education to create a process of education that produces practitioners who have the skills and knowledge needed to deliver health care in the 21st century.

In order to address this criticism, a consensus must be reached regarding the desirable skills and knowledge for practitioners delivering health care in the next century. With a rich discussion about those core skills under way, a consensus may emerge, but does not yet exist. Others[1] have included managing populations of patients, cost-effective use of diagnostic and treatment resources, the ability to work in teams, managing information, continuous quality improvement, ethics, and use of evidence in making decisions as essential curricular elements. Integrating these elements into an already full postgraduate educational curriculum will be a challenge, perhaps long overdue.

Graduate medical education encompasses all training years after graduation from medical school. Essentially two paths may be chosen by students of medicine: (1) a preliminary year (or years) of training in preparation for specialty training in fields such as radiology, anesthesiology, psychiatry, rehabilitation medicine, neurology, dermatology, emergency medicine, and specialty surgical training such as urology and otolaryngology; and (2) comprehensive training in family medicine, general internal medicine, general pediatrics, obstetrics and gynecology, and general surgery (between 3 and 5 years of training each). Each of these last five disciplines, except for family medicine, offers further subspecialty training fellowships.

Addressing the unique aspects of each of these disciplines as it intersects with the issues of preparation for practice in the 21st century is beyond the scope of this article. Instead, this article will focus on the generalist specialties of family medicine, pediatrics, and general internal medicine. Trends have predicted an undersupply of generalist physicians (family medicine, internal medicine, and pediatrics) for the year 2000.[2] In order to meet the health care needs of the projected population in the United States, reform in education must not only address the curricular challenge that graduates of GME training programs are unprepared, but must also address barriers

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ABBREVIATIONS USED IN TEXT
AIDS = acquired immunodeficiency syndrome
GME = graduate medical education
HIV = human immunodeficiency virus

to training adequate generalists and promote generalism as a laudable choice for medical students.

It is the purpose of this article to address the criticism that graduate medical education fails to adequately prepare physicians to enter the workforce. Arguments will be made both for and against this assertion. Broad qualitative changes that graduate medical education has undergone and is undergoing will be discussed. Population health management, clinical resource management, teamwork, continuous quality improvement, ethics, and evidence-based medicine will be addressed as important curricular elements for residency training. Finally, innovations in graduate medical education that are being introduced as well as those that should be tried will be discussed.

Failure of Graduate Medical Education

Surveys of students and recent graduates by the Association of American Medical Colleges[1] indicate that graduates feel unprepared in the area of practice management. Others[2] report that recent graduates in practice only a few years felt inadequately trained in cost-effective practice and practice management. Group Health Association of America reported that one half to three quarters of the health maintenance organization plans surveyed believed that generalists are poorly prepared for practice in the managed care environment.[5,6] Such surveys raise serious questions about the ability of GME programs to prepare young physicians for practice.

Several factors contribute to this lack of preparation. First, the majority of training still occurs in the hospital setting. Yet, the majority of clinical practice, except for the hospital-based specialists (emergency medicine, anesthesiology, critical care specialists, etc), occurs in the outpatient setting. "Ninety-five percent of physician-patient contacts are in ambulatory care settings."[7] Learning takes place best in context. Residents will learn to be efficient practitioners of ambulatory medicine when educated in that setting.

Second, most residency training still occurs in a fee-for-service environment. Since the majority of GME training sites are academic medical centers and community hospitals not yet fully integrated into managed care systems, residents are learning to deliver care in systems that are atypical. As residents learn to deal with episodes of illness, they lack training in managing populations of patients to whom they are responsible for health and illness care. Faculty model practice behaviors, consciously and unconsciously, that work within their particular practice environment. Managing a population of patients, or considering costs when contemplating a treatment plan, is a behavior unlikely to be modeled when negative incentives for such behaviors exist. Unless practice management, resource management, and population-based thinking are explicitly taught, are integral parts of the training curriculum, and are modeled by the teaching faculty, residents graduate with a paucity of experience that helps them transition to practice in a managed care environment.

Analysis of the Accreditation Council for Graduate Medical Education (ACGME) special requirements[8] for training in family medicine, internal medicine, pediatrics, and obstetrics and gynecology reveals that family medicine, pediatrics, and internal medicine require 91% to 95% of the core competencies for primary care practice. Obstetrics and gynecology requires only 47% of those same core competencies be taught for accreditation of their programs. Additionally, family medicine addresses issues of community or public health and practice management, while pediatrics and internal medicine do not. Internal medicine addresses competencies in cost-effective care and medical informatics or computer training, while the others do not. Pediatrics additionally fails to require risk management training. Family medicine fails to require training in medical ethics.

In summary, both graduates of residency training programs and their future health maintenance organization employers report inadequate preparation for practice in the managed care environment. Contributing factors include lack of training in the ambulatory setting, lack of residency accreditation requirements that promote adequate preparation, and training predominantly in the fee-for-service environment by faculty who model the behaviors required by that environment.

Graduate Medical Education—The Fundamentals

Some have argued that training to work in a specific practice environment should not be the job of graduate medical education programs. Nearly all physicians report receiving "on-the-job" training during their first year or two of practice—training that consists of learning how to work within their own particular system. Described as "vocational" training, not medical education, it is reasonable to ask: Is vocational training really the job of graduate medical education programs when the actual vocational skills required in a particular system might be unique? Expressing concern that special needs may unduly influence the content of the curriculum of medical training, Kassirer[9(p 508)] writes:

> I believe that medical centers do need to improve the way they teach students and residents how to use diagnostic tests and that they must focus more on cost-conscious decision making. It is not clear, however, how much the training of primary care physicians should be influenced by the special needs of managed-care plans. What part of the benefit of teaching these new disciplines accrues to patients and what part to the bottom line of manage-care organizations should be an important consideration.

The fundamental knowledge of medicine and the clinical characteristics of disease, the skills of interviewing and examining patients, decision analysis and clinical reasoning, and lifelong learning are not new "21st century" skills.[10] Rather, they are the skills that have been promoted by GME programs for decades. The actual modeling of practice during training is influenced by the medical marketplace. As faculty in medical schools and clinician-educators in the community model behaviors of cost management, population-based thinking, and teamwork in the medical care they deliver, residents will acquire these new skills. Fundamental curricular changes should not be made in response to pressures of current health delivery systems that are subject to market place evolution. Those health delivery systems are likely to continue to evolve and may be very different for graduates five years from now. Residents should acquire the fundamental skills for medical practice, including an appreciation of health policy and medical marketplace issues, and skills of flexibility and creativity that allow for adaptation within their practice environment over their lifetimes. "[T]raining program directors must continue to insist on a rigorous education in the knowledge base and cognitive skills of clinical medicine, assert their responsibility to decide what is best to teach, and avoid trendy educational fads."[9(p508)]

The product of a collaborative curriculum writing project, The Federated Council for Internal Medicine Resource Document, addresses issues of practice management in sections titled "The Management of the Quality of Health Care" and "The Management of Medical Practice." This document is intended to serve as a resource for internal medicine residency programs implementing curricula at a local level. Inclusion of these topics as a priority for training residents is a first step.

Residency accreditation committee requirements evolve fairly rapidly and have introduced training requirements in health policy, ethics, quality improvement and team management in an effort to address some of these issues. As a result, training programs are adapting to provide training appropriate for the future.

In summary, it is not the responsibility of the graduate medical education programs to provide vocational training to meet specific skill needs of employers. Rather, it is the responsibility of these programs to provide rigorous training in medicine and promote adaptability, the development of leadership skills, and lifelong learning in the graduates. Residency accreditation requirements are responsive to the changing health care environment. More specific, market-sensitive curricular changes may be obsolete before the skills and knowledge taught are ever used.

Recent Changes in Graduate Medical Education

GME Position Allocation

Concerned with the projected oversupply of physicians, leaders in medical education and government have proposed that the number of US GME training positions be capped at 110% of the total number of graduates from US medical schools. Predetermining the specific number of training positions in each field has also been entertained. However, recent National Resident Matching Program results show a trend toward medical school graduates choosing generalist training positions more frequently. This supports the hypothesis that the market drives competition for training positions and influences the career choices of medical students.

Contemplation of "right-sizing" GME has required education leaders to reexamine the mission of postgraduate training. A drastic reduction in the number of training positions will force a careful and thoughtful review of the US role in training clinicians from the world, the role of residents in providing care to uninsured and disenfranchised patient populations, and the role of residents in keeping the doors of the nation's hospitals open. "Right-sizing" GME should be done by a diverse, dispassionate group of stakeholders willing to consider the intended as well as the unintended consequences of its actions.

Subspecialists' Role in Health Care of the Future

Integrated medical care systems, which include primary care physicians and hospitals, some specialty services, home care, pharmacies, and nursing homes and bear some or all of the financial risk for the cost of care to a population of insured members, are impacting the future training and practice environment of subspecialists as well. The total supply of subspecialists will likely decrease, and the skills required of the subspecialist in the integrated medical system will be different.[11] In addition to providing excellent patient care in their subspecialty, subspecialists will be challenged to assure system excellence (high quality at lowest cost) in the delivery of care in their area of expertise. "Subspecialists will have to become educators, systems designers, team facilitators, and public health advocates."[11(p89)]

> Training programs (and continuing medical education programs) will need to make sure that their graduates know a great deal more than the diagnostic and therapeutic skills pertinent to the specialty. The new subspecialist will need to appreciate and understand systems theory, as well as how to understand and improve processes of work. He will need to be a team leader and teacher. He will need to be statistically literate—so as to be able to distinguish signal from noise in measurements of key processes and outcomes.[11(p90)]

In this article, Reinertsen was speaking of internal medicine. But the assertion applies equally well to the medical domains of surgery, pediatrics, and obstetrics and gynecology. Subspecialty surgeons will be required to teach primary care teams (physicians, nurses, and allied health professionals) how to manage those issues where quality outcomes can be achieved before reaching the surgeon. For example, the treatment of sinusitis will be managed by the primary care team, not the otolaryn-

gologist; uncomplicated pregnancies and deliveries will be managed by nurse midwives or family practitioners, not obstetricians; and evaluation and management of incontinence will be done by the primary care physician, not the urologist. The surgeons, as educators, will be responsible for assuring that these primary delivery teams are able to recognize complications in their earliest form and recognize when a patient's course no longer fits the expected pattern for a practice guideline.

Quality

Medical literature refers often to the quality of care provided to patients. In that context, quality is defined relative to clinical outcomes, service, and cost. Some express the need for quality training programs. Yet, "quality" is not clearly defined for residency education programs. If educational quality can be defined, measured, and monitored, the application of quality educational outcomes measures may help GME programs to continuously adapt and improve as they prepare graduates for practice. Although they can be involved in measuring and monitoring the quality, accrediting bodies should not take responsibility for defining quality in GME. Rather, major stakeholders of the educational process, including patients, medical students, residents, medical school leadership, residency program leadership, faculty, and employers of physicians, should work together to define quality in GME programs.

Faculty Development

As training moves to ambulatory sites and likely involves more community-based faculty, educational programs are needed to teach faculty at all sites the skills required to teach effectively and efficiently in the ambulatory setting. Faculty development programs should aim to teach clinicians how to be teachers (of patients, students, residents, and each other), be team leaders, be experts in systems theory, understand and improve processes of work, and be statistically literate.[12] And all of these skills should be taught to and modeled for residents, the next generation of teaching faculty.

Faculty Promotion

Academic medical centers and community hospital training programs need to demonstrate actions that value teachers. And those actions must translate into observable, measurable organizational behaviors that speak to the value of teaching. As funding of medical schools shifts from grants and operating revenues to include, in significant proportion, clinical revenues generated by medical school faculty in support of the fiscal health of the schools, the primary focus of the medical school's faculty also shifts in the direction of clinical productivity. Fiscal concerns can overshadow academic ones.[12] Shrinking resources available for salary increases pressure to secure more grants and generate more patient care revenues. These activities draw faculty members away from their teaching activities, particularly in preparing for teaching, advising students and residents, and critiquing learner performance.

In order to address the need for more teaching and excellence in teaching, educator portfolios are being used in many medical schools (Harvard, Medical College of Wisconsin, University of Washington School of Medicine, and others) as a basis for displaying and judging instructional scholarship. Clinician-educator tracks are being used to recruit, retain, and promote faculty members whose primary responsibilities are to provide patient care and to teach medical students and residents. Monitoring the educational impact, positive and negative, of these innovations is required.

Barriers to Innovation

Before potential innovations in graduate medical education can be described, specific barriers to program innovation must be identified and addressed. Specifically, the funding of education, special issues of funding of ambulatory education, teaching skills for ambulatory medicine, the service role of residents in our nation's hospitals, and insurance issues must be addressed.

One can make the argument that trained physicians, the outputs of medical schools and residencies, are a *common good*. Regions that do not have medical schools or residency programs do not financially support the training of the physicians who eventually serve their community. "Because the academic medical centers benefit all of us (and in particular managed-care organizations, which use their educational and research products directly), their added expense should be borne broadly."[13(p1370)] Managed care organizations have been urged to help fund GME. For-profit managed care has resisted participating in the cost of educating future employees.[14]

Although a shift toward training in the ambulatory setting is occurring, significant barriers persist that delay and/or prevent this shift. Barriers include funding, faculty skills, and patient availability. Medicare currently is the primary source of funding for GME. These payments are directed to hospitals, not training programs. Payments shrink when residents are placed in ambulatory training sites.

Teaching faculty learned to teach in the hospital setting using a model that does not easily adapt to the ambulatory setting. Coupled with pressures to be productive and efficient in their own ambulatory practices, faculty often lack the skills and ability to teach efficiently in the ambulatory setting.

Residents in internal medicine, general surgery, anesthesiology, radiology, pediatrics (family medicine to a lesser degree), and many of the subspecialties of medicine and surgery have traditionally been used to staff patient care services provided by hospitals at a lower cost than would be required by fully licensed physicians. Leaders in health policy need to find another way to support teaching hospitals, hospitals that traditionally serve the uninsured and disenfranchised. Until this resident-service function is dissociated from the educational

goals and requirements for GME, the important shift of education to the ambulatory training site will be stymied. Residents should be freed up to train where the living curriculum of patients exists: ambulatory sites, long-term care facilities, and community health clinics.

In clinical training, the patients are the cornerstone of learning. The availability of patients for residents to evaluate and manage in an ambulatory continuity practice varies significantly. The ability of training programs with continuity training requirements (family medicine, internal medicine, and pediatrics) to provide residents with a population of patients for whom the residents are responsible is increasingly hampered by insurance systems that exclude residents from the lists of potential primary care providers. One of the unintended consequences of this action is to limit the residents' ability to learn to work within the current health care environment. Managed care organizations and other insurance companies need to creatively address this "resident-as-primary-care-provider" issue and promote the acquisition of a panel of continuity patients for residents to manage. Learning in context to manage this panel with a team of other health care providers may be the best preparation for future practice.

Assuming that these barriers will be adequately addressed, leaders in medical education can focus their attention on the core curricular issues and innovations in GME.

New Curricular Essentials

Population Health

As health delivery systems share the financial risk of care delivery, managing the health of the population served by that system becomes critical. Integrating residents into these systems for training exposes them to a new way of thinking about health promotion, disease prevention, and management of costs for a population of patients. The Harvard Community Health Plan's partnership with Harvard University Medical School has provided a vibrant practice setting for teaching population-based medicine.[15] Curriculum in this area should teach students and residents how to assess and proactively manage the health of the population they serve, rather than waiting for the individual patient to appear in the system with symptoms, health questions, and care needs for illness. Residents will learn to appreciate that responsible resource management may pit individual benefits against community health benefits.

Needs of Special Populations: AIDS and Geriatrics

With the growing human immunodeficiency virus (HIV)-infected population and the general aging of the population, strong skills in care delivery for HIV/AIDS patients and strong geriatric skills are required to meet the health care needs of the population through population health management. Opportunities exist to teach residents management of the health of the geriatric population at a particular training site through projects such as promotion of immunizations and prevention of falls. Such projects lend themselves well to the scholarly activities of residents in training. Some residency programs are experimenting with creative ways to provide learning opportunities in these areas.

Quality Improvement

Instruction in continuous quality improvement is beginning to appear in residency accreditation guidelines. Few residency programs have formally integrated house staff into continuous quality improvement teams and published their results.[16] Others have experimented with quality improvement as a residency program management technique.[17] These efforts should be supported and expanded.

Ethics

The ethical issues of health care delivery are increasingly complex. Better training is required for residents to appreciate the complexity and the potential conflict of interest between their fiduciary duty to patients, the population of patients they manage, and the health system that employs them. The integration of distributive justice issues into clinical case analysis is emerging in the medical ethics literature.[18–20] The notion of integrated health systems as part of a community serving all members of that community, not just those enrolled as members of a particular health plan, should be addressed.

Evidence-Based Decision Making

Work by the McMaster Evidence-Based Working Group and others has revolutionized the application of evidence in clinical decisions. Understanding how to frame a specific clinical question, search the medical database for relevant literature, read the medical literature, interpret results, and apply those results to the clinical question posed is becoming a more common practice in residency programs. Actualizing this curriculum is hampered not by the enthusiasm of the faculty and residents, but by the lack of available computerized databases at practice sites where clinical questions arise.

Information Management

Information systems in integrated health delivery systems are increasingly sophisticated in the relational information they can provide about patients and populations. Residents training in these settings are beginning to appreciate the art of gaining knowledge from information and their ability to use this knowledge to influence the health of their patient population. Such information networks and treatment pathways will shift the educational needs of residents from the acquisition of retrievable knowledge that will be readily available on-line to managing information appropriately. For example, residents will need to be able to criticize the appropriate application of a practice guideline to a particular patient and recognize when a guideline needs to be improved as new evidence is available.

Teamwork

Although residency education has long been organized around the inpatient "ward" team, learning to work as members of the multidisciplinary health care team in the inpatient and ambulatory setting is lacking. Others have suggested that training programs should provide residents with experience working in teams with administrators, allied health professionals, social workers, information systems staff, and utilization management staff. Residents should learn to be ambulatory care team members and team leaders in the delivery of health care in the ambulatory setting by working with and learning the specific roles and responsibilities of nurses, office staff, social workers, and colleagues in the delivery of health care.

Innovations

Partnerships Between Academic Health Centers and Managed Care Organizations

Some managed care organizations have participated as demonstration sites for residency training. Some of these experiments have failed quickly and quietly, in part because of the inefficiencies and excessive costs associated with learning. Meaningful educational partnerships[21] between training programs and managed care organizations offer opportunity for collaboration in educational research, instruction, and curriculum. Both partners must share educational goals and the costs of providing the education. Investing in physicians-in-training can be viewed as an investment in the future.

Structure of Programs

Opportunity exists to revolutionize residency training structures. Some have recommended that residents be trained to manage patients, not episodes of illness, and that training structures enhance the ability of residents to provide continuity of care across settings such as the medical clinic, the hospital, patients' homes, and the nursing home. Such training should enhance residents' sophistication in the use of evidence as it applies to clinical decisions and should provide opportunities for residents to work in teams broadly defined to include community-based social services.

If the residency program is restructured with a broadly defined continuity clinic experience as the pivot point of the training program and the resident is provided with a population of patients to manage over time and across settings, then all other aspects of training serve to enhance the resident's ability to provide high-quality care to that population of patients. This model could be designed to simulate a future practice including teamwork, practice management, community outreach including home care and long-term care, and resource management.

Practice Management

Frank[22] has proposed a three-year practice management curriculum for residency training. It includes some basic areas such as interpersonal skills training, medical documentation, personal financial budgeting and retirement planning, and specific practice management training in areas such as general operations management, including practice opportunities and evaluation, financial management, staff and personnel operations, marketing, health care contracting, medical information systems, legal issues, consultants, and community resources. The main drawback for such a curriculum is competition with other curricular elements. The opportunity exists for creative integration of these elements into the patient care aspects of the residency curriculum through model training practices.

Integrative Disciplines

Most people self-treat common ailments before seeking conventional medical care. If a symptom is broadly defined as any perceived change in health, 70% to 90% of all symptoms are self-diagnosed and self-treated without the help of health professionals. Additionally, many people use unconventional therapies such as homeopathy, acupuncture, chiropractic, and massage therapy for common ailments. "The frequency of use of unconventional therapy in the US is far higher than previously reported."[23(p246)] Not only should residents be taught to ask their patients, in a nonjudgmental manner, about the use of such therapies, they should also improve their understanding of the risks and benefits of such therapies, critically applying the rules of evidence in critiquing these alternative practices. Health services research efforts comparing outcomes with conventional and unconventional medical care will provide the needed objectivity in the analysis of alternative therapies. Some academic institutions, such as Harvard University and the University of Arizona, are developing fellowship training programs in "integrative disciplines" to achieve these aims.

Conclusion

Arguments support both sides of the criticism that present-day GME fails to prepare residents to practice in the 21st century. Experiments in medical education are needed to substantiate or refute claims on both sides. Residency programs are most often using managed care practice sites for rotations to teach the traditional curriculum rather than capitalizing on the opportunity to teach cost-effective analysis, management of a population of patients, or quality management. A powerful opportunity exits to study and document educational outcomes in comparative settings of the traditional educational environment and managed care organizations.

Graduate medical education is funded by the public, not managed care organizations. Major reform should not be driven by the needs of managed care organizations. Instead, leaders in medical education must insist on rigorous education programs that provide the knowledge, clinical skills, and attitudes necessary to practice medicine while adapting educational curricula to improve the way residents are taught to use medical evi-

dence, diagnostic tests, information, and resources. Residency programs should promote critical analysis and healthy discourse regarding population health management, the ethics of managed care, and health policy, aiming to produce adaptable, well-trained, critical thinkers and leaders ready to enter the medical marketplace regardless of its form. "The happiest and best physicians of the 21st century are likely to be those who leave their residencies with the scientific, analytic, and personal skills and attitudes necessary not only to adapt to continuous change, but also to lead continuous improvement in their own practice and settings."[24(p727)]

REFERENCES

1. Jacobs MO, Mott PD. Physician characteristics and training emphasis considered desirable by leaders of HMOs. J Med Educ 1987; 62:725–731

2. Improving Access to Health Care Through Physician Workforce Reform: Directions for the 21st Century. Council on Graduate Medical Education, Third Report. US Department of Health and Human Services, Health Resources and Services Administration, 1992

3. Association of American Medical Colleges Executive Council. Roles for medical education in health care reform. Acad Med 1994; 69:512–515

4. Cantor JC, Baker LC, Hughes RG. Preparedness for practice: young physicians' views of their professional education. JAMA 1993; 270:1035–1040

5. Reynolds DS. A Matter of Payer's Preference. American Board of Internal Medicine Summer Conference Report, 1993

6. Palsbo SE, Sullivan CB. The Recruitment Experience of Health Maintenance Organizations for Primary Care Physicians. Final Summary Report. Health Resources and Services Administration. Project No. HRSA 92-1990, May 1993

7. Lesky LG, Hershman WY. Practical approaches to a major educational challenge. Arch Intern Med 1995; 155:897–904

8. Rivo ML, Saultz JW, Wartman SA, DeWitt TG. Defining the generalist physician's training. JAMA 1994; 271:1499–1504

9. Kassirer JP. Redesigning graduate medical education—location and content. N Engl J Med 1996; 335:507–508

10. Gerber PD, Smith DS, Ross JM. Generalist physicians and the new health care system. Am J Med 1994; 97:554–558

11. Reinertsen J. The Future Role of the Medical Subspecialist in an Integrated Managed Care Environment: Changing Patterns of Utilization and Compensation. American Board of Internal Medicine Summer Conference Report 1994, pp 87–90

12. Bland CJ, Holloway RL. A crisis of mission. Change 1995 Sep/Oct, pp 30–35

13. Kassirer JP. Academic medical centers under siege. N Engl J Med 1994; 331:1370–1371

14. Hasan MM. Let's end the nonprofit charade. N Engl J Med 1996; 334:1055–1057

15. Moore GT, Inui TS, Ludden JM, Schoenbaum SC. The 'teaching HMO': a new academic partner. Acad Med 1994; 69:595–600

16. Chessman A, Bellack JP, Cleghorn GD, Kennedy DB, Lahoz MR, Slaughter SC, et al. Institutionalizing continuous improvement in South Carolina: taking it 'bird by bird.' J Qual Improvement 1996; 22:177–186

17. Ellrodt AG. Introduction of total quality management (TQM) into an internal medicine residency. Acad Med 1993; 68:817–823

18. Miles SH, Koepp R. Comments on the AMA report 'Ethical Issues in Managed Care.' J Clin Ethics 1995; 6:306–311

19. Angell M. The doctor as double agent. Kennedy Inst Ethics J 1993; 3:279–286

20. Menzel P. Double agency and the ethics of rationing health care: a response to Marcia Angell. Kennedy Inst Ethics J 1993; 3:287–292

21. Moore GT. Health maintenance organizations and medical education: breaking the barriers. Acad Med 1990; 65:427–431

22. Frank RA. Practice management education—are residency programs properly preparing physicians for the 21st century? College Rev 1993 Fall, pp 22–47

23. Eisenberg DM, Kessler RC, Foster C, Norlaock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States. N Engl J Med 1993; 328:246–252

24. Blumenthal D, Thier SO. Managed care and medical education: the new fundamentals. JAMA 1996; 276:725–727